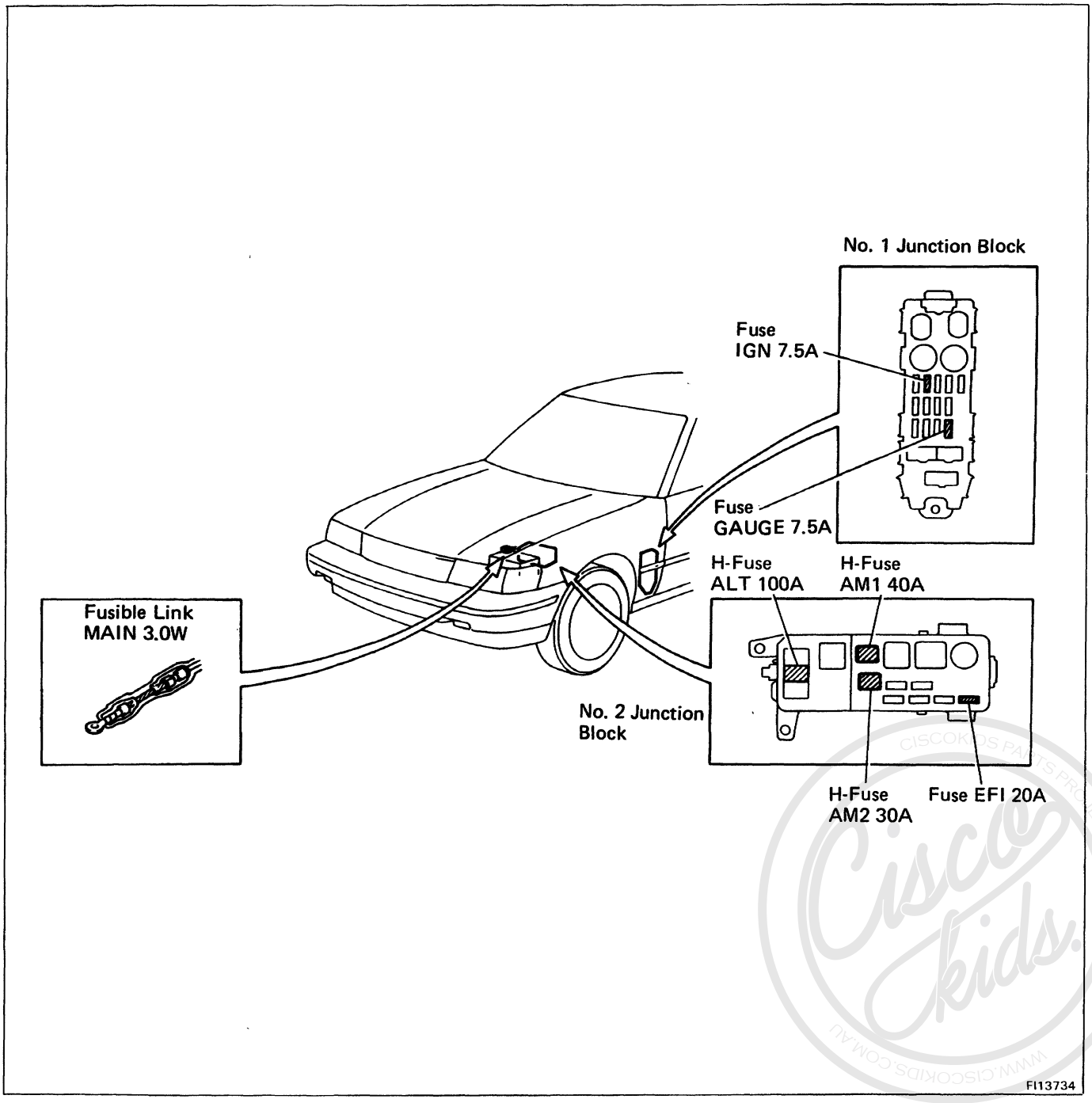
# TROUBLESHOOTING WITH VOLT OHMMETER

HINT: The following troubleshooting procedures are designed for inspection of each separate system, and therefore the actual procedure may vary somewhat. However, troubleshooting should be performed referring to the inspection methods described in this manual.
Before beginning inspection, it is best to first make a simple check of the fuses, fusible links and condition of the connectors.

The following troubleshooting procedures are based on the supposition that the trouble lies in either a short or open circuit in a component out side the computer or a short circuit within the computer.
If engine trouble occurs even though proper operating voltage is detected in the computer connector, then it can be assumed that the engine ECU is faulty and should be replaced.

## LOCATION OF FUSES AND FUSIBLE LINK

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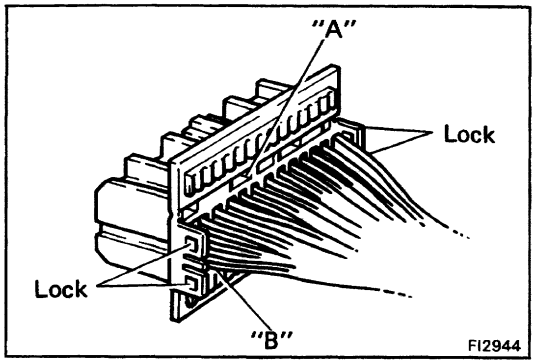
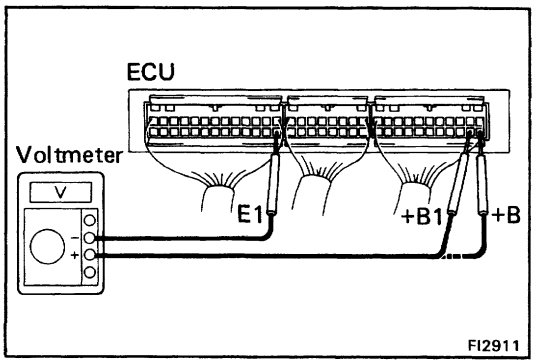



# EFI SYSTEM CHECK PROCEDURE

## PREPARATION

(a) Disconnect the connectors from the engine and ECT ECU.

(b) Remove the locks as shown in the illustration so that the tester probe(s) can easily come in.

**NOTICE: Pay attention to sections "A" and "B" in the illustration which can be easily broken.**

(c) Reconnect the connectors to the engine and ECT ECU.

HINT:

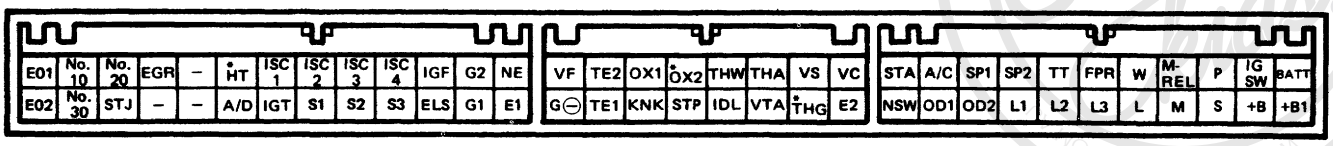
- Perform all voltage measurements with the connectors connected.
- Verify that the battery voltage is 11 V or more when the ignition switch is in the "ON" position.

Using a voltmeter with high impedance (10 kΩ/v minimum), measure the voltage at each terminal of the wiring connectors.

## Terminals of Engine and ECT ECU

| Symbol | Terminal Name | Symbol | Terminal Name | Symbol | Terminal Name |
|---|---|---|---|---|---|
| E01 | POWER GROUND | G2 | DISTRIBUTOR | A/C | A/C COMPRESSOR |
| E02 | POWER GROUND | G1 | DISTRIBUTOR | OD1 | CRUISE CONTROL COMPUTER |
| No. 10 | INJECTOR (No. 1 and 6) | NE | DISTRIBUTOR | SP1 | NO. 1 SPEED SENSOR (Meter side) |
| No. 30 | INJECTOR (No.4 and 5) | EI | COMPUTER GROUND | OD2 | OD MAIN SWITCH |
| No. 20 | INJECTOR (No.2 and 3) | VF | CHECK CONNECTOR | SP2 | NO.2 SPEED SENSOR (A/T side) |
| STJ | COLD START INJECTOR | G(–) | DISTRIBUTOR | L1 | TEMS ECU |
| EGR | VSV(EGR) | TE2 | TDCL | TT | TDCL |
| – | – | TE1 | CHECK CONNECTOR,TDCL | L2 | TEMS ECU |
| – | – | ox1 | OXYGEN SENSOR | FPR | FUEL PUMP RELAY |
| – | – | KNK | KNOCK SENSOR | L3 | TEMS ECU |
| *HT | OXYGEN SENSOR HEATER | *ox2 | SUB–OXYGEN SENSOR | W | WARNING LIGHT |
| A/D | CRUISE CONTROL COMPUTER | STP | STOP LIGHT SWITCH | L | SHIFT POSITION SWITCH |
| ISC1 | ISC MOTOR NO. 1 COIL | THW | WATER TEMP. SENSOR | M–REL | EFI MAIN RELAY (COIL) |
| IGT | IGNITER | IDL | THROTTLE POSITION SENSOR | M | SHIFT POSITION SWITCH |
| ISC2 | ISC MOTOR NO. 2 COIL | THA | AIR TEMP. SENSOR | P | SHIFT POSITION SWITCH |
| S1 | ECT SOLENOID | VTA | THROTTLE POSITION SENSOR | S | SHIFT POSITION SWITCH |
| ISC 3 | ISC MOTOR NO. 3 COIL | VS | AIR FLOW METER | IG SW | IGNITION SWITCH |
| S2 | ECT SOLENOID | *THG | EGR GAS TEMP. SENSOR | +B | EFI MAIN RELAY |
| ISC4 | ISC MOTOR NO. 4 COIL | VC | AIR FLOW METER, THROTTLE POSITION SENSOR | BATT | BATTERY |
| S3 | ECT SOLENOID | E2 | SENSOR GROUND | +B1 | EFI MAIN RELAY |
| IGF | IGNITER | STA | STARTER SWITCH | – | – |
| ELS | HEAD LIGHT RELAY, DEFOGGER RELAY | NSW | NEUTRAL START SWITCH | – | – |

**Engine and ECT ECU Terminals**


E01 No. 10 No. 20 EGR – *HT ISC 1 ISC 2 ISC 3 ISC 4 IGF G2 NE
E02 No. 30 STJ – – A/D IGT S1 S2 S3 ELS G1 E1
VF TE2 OX1 *OX2 THW THA VS VC
G⊖ TE1 KNK STP IDL VTA *THG E2
STA A/C SP1 SP2 TT FPR W M-REL P IG SW BATT
NSW OD1 OD2 L1 L2 L3 L M S +B +B1

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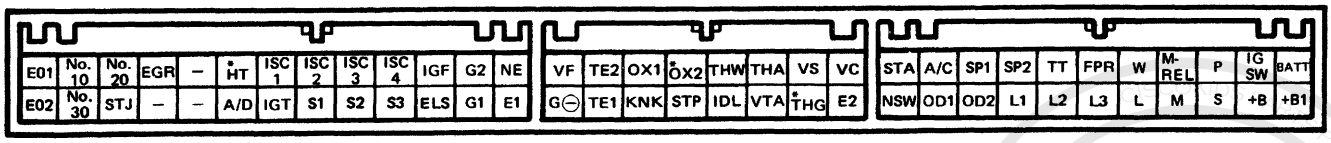
# Voltage at Engine and ECT ECU Wiring Connectors

| No. | Terminals | Condition | | STD Voltage | See page |
|---|---|---|---|---|---|
| 1 | BATT – E1 | — | | 10 – 14 | FI–32 |
| | IG SW – E1 | Ignition SW ON | | 10 – 14 | FI–33 |
| | M-REL – E1 | | | | |
| | +B (+B1) – E1 | | | | FI–34 |
| 2 | IDL – E2 | Ignition SW ON | Throttle valve open | 4 – 6 | FI–35 |
| | VC – E2 | | — | 4 – 6 | FI–36 |
| | VTA – E2 | | Throttle valve fully closed | 0.1 – 1.0 | |
| | | | Throttle valve fully open | 3.2 – 4.2 | |
| 3 | VC – E2 | Ignition SW ON | — | 4 – 6 | FI–37 |
| | VS – E2 | | Measuring plate fully closed | 3.7 – 4.3 | |
| | | | Measuring plate fully open | 0.2 – 0.5 | |
| | | Idling | | 2.3 – 2.8 | |
| | | 3,000 rpm | | 1.0 – 2.0 | |
| 4 | No.10 No.20 – E01 E02 No.10 | Ignition SW ON | | 10 – 14 | FI–38 |
| 5 | THA – E2 | Ignition SW ON | Intake air temperature 20°C (68°F) | 1 – 3 | FI–39 |
| 6 | THW – E2 | Ignition SW ON | Coolant temperature 80°C (176°F) | 0.1 – 1.0 | FI–40 |
| 7 | STA – E1 | Cranking | | 6 – 14 | FI–41 |
| 8 | IGT – E1 | Idling | | 0.7 – 1.0 | FI–42 |
| 9 | ISC1 ISC4 – E1 | Ignition SW ON | | 9 – 14 | FI–43 |
| 10 | W – E1 | No trouble ("CHECK" engine warning light off) and engine running | | 8 – 14 | FI–44 |
| 11 | A/C – E1 | Ignition SW ON | Air conditioning ON | 10 – 14 | FI–45 |

**Engine and ECT ECU Terminals**


E01 No.10 No.20 EGR – *HT ISC1 ISC2 ISC3 ISC4 IGF G2 NE
E02 No.30 STJ – – A/D IGT S1 S2 S3 ELS G1 E1
VF TE2 OX1 *OX2 THW THA VS VC
G⊖ TE1 KNK STP IDL VTA *THG E2
STA A/C SP1 SP2 TT FPR W M-REL P IG SW BATT
NSW OD1 OD2 L1 L2 L3 L M S +B +B1

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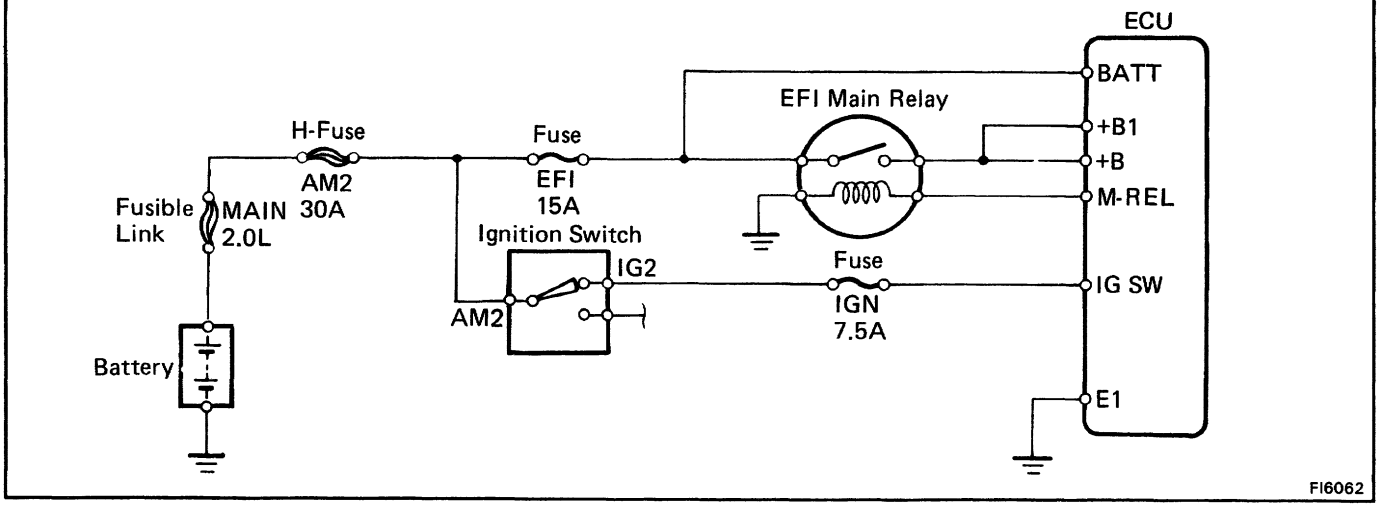
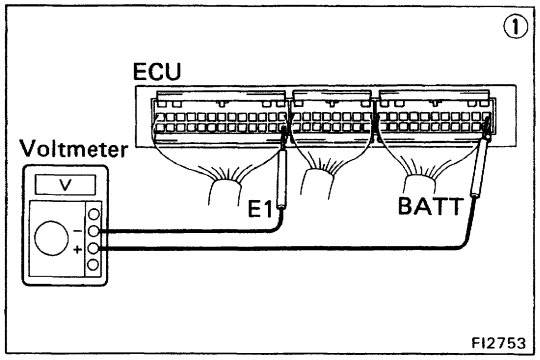
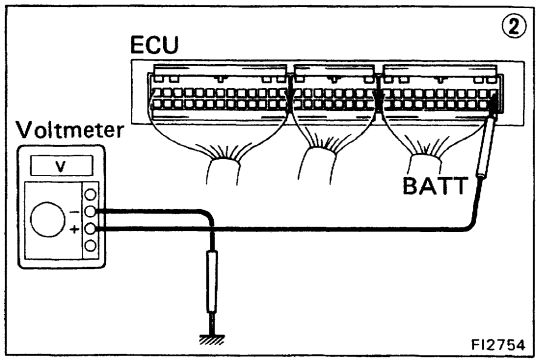
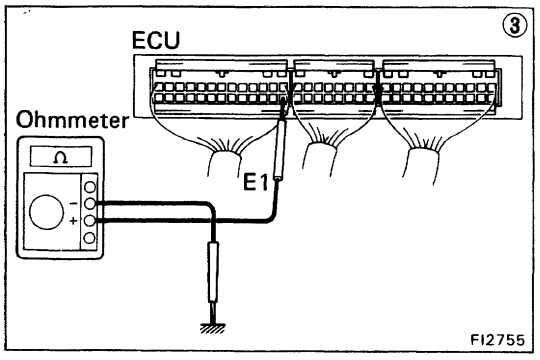
| No. | Terminals | Trouble | Condition | STD Voltage |
|---|---|---|---|---|
| 1 | BATT – E1 | No voltage | – | 10 – 14 V |
| | IG SW – E1 | No voltage | Ignition switch ON | 10 – 14 V |
| | M-REL – E1 | No voltage | Ignition switch ON | 10 – 14 V |
| | +B (+B1) – E1 | No voltage | Ignition switch ON | 10 – 14 V |




- **BATT – E1**

① There is no voltage between ECU terminals BATT and E1.

↓

② Check that there is voltage between ECU terminal BATT and body ground.

NO ← ② → OK

OK → ③ Check wiring between ECU terminal EI. and body ground.

③ OK → Try another ECU.

③ BAD → Repair or replace.

NO → Check fuse and fusible link.

Check fuse and fusible link. BAD → Replace.

Check fuse and fusible link. OK →

Check wiring between ECU terminal and battery. BAD → Repair or replace.

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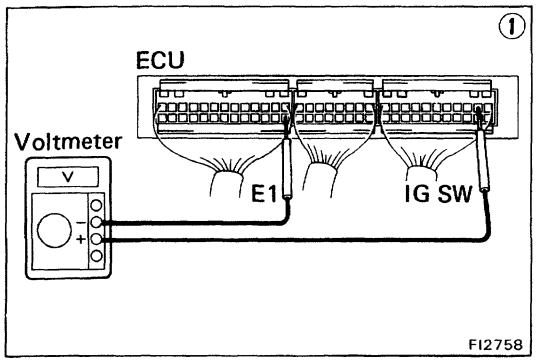
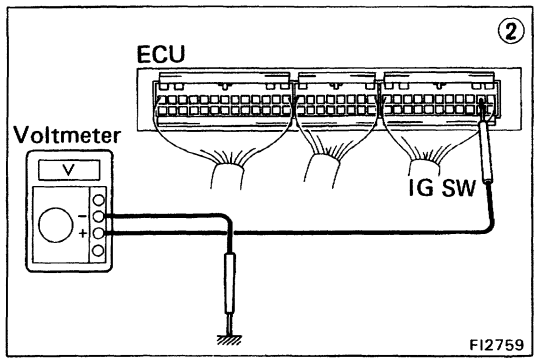



- **IG SW – E1**

① There is no voltage between ECU terminals IG SW and E1. **(IG SW ON)**

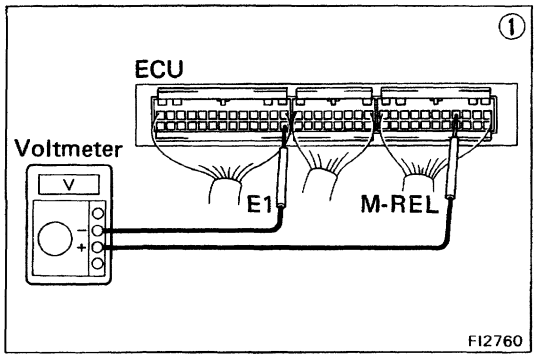
② Check that there is voltage between ECU terminal IG SW and body ground. **(IG SW ON)**

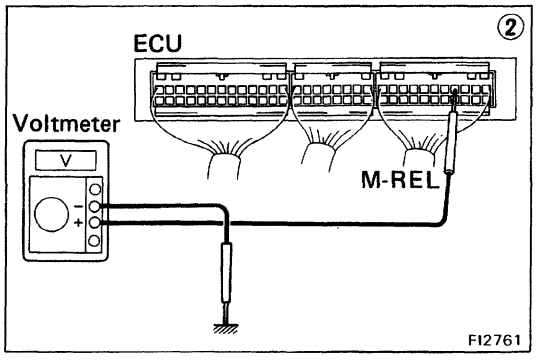
NO → Check fuse, fusible link and ignition switch. BAD → Repair or replace.

OK → Check wiring between ECU terminal E1 and ground.

OK → Try another ECU.

BAD → Repair or replace.




- **M–REL – E1**

① There is no voltage between ECU terminals M–REL and E1. **(IG SW ON)**

② Check that there is voltage between ECU terminal M–REL and body ground. **(IG SW ON)**

NO → Check EFI main relay and wiring harness. BAD → Replace.

OK → Try another ECU.

OK → Check wiring between ECU terminal E1 and ground.

OK → Try another ECU.

BAD → Repair or replace.

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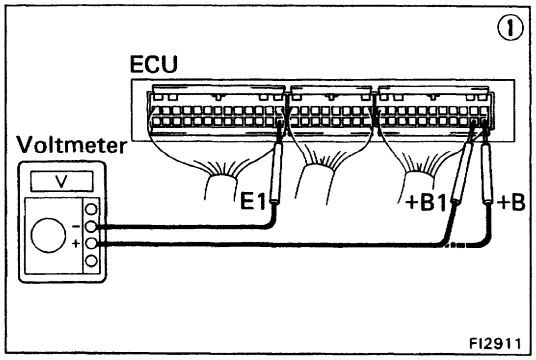


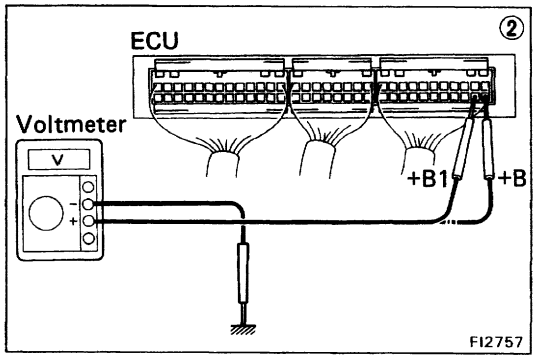


- **+B (+B1) – E1**

① There is no voltage between ECU terminals + B (+ B1) and E1. **(IG SW ON)**

↓

② Check that there is voltage between ECU terminal +B (+ B1) and body ground. **(IG SW ON)**

NO → OK

OK → Check wiring between ECU terminal E1 and ground.

OK → Try another ECU.

BAD → Repair or replace.

NO → Check fuse, fusible link and wiring harness.

BAD → Repair or replace.

OK → Check EFI main relay. (See page FI–76)

BAD → Replace.

OK → Refer to M–REL – E1 trouble section.

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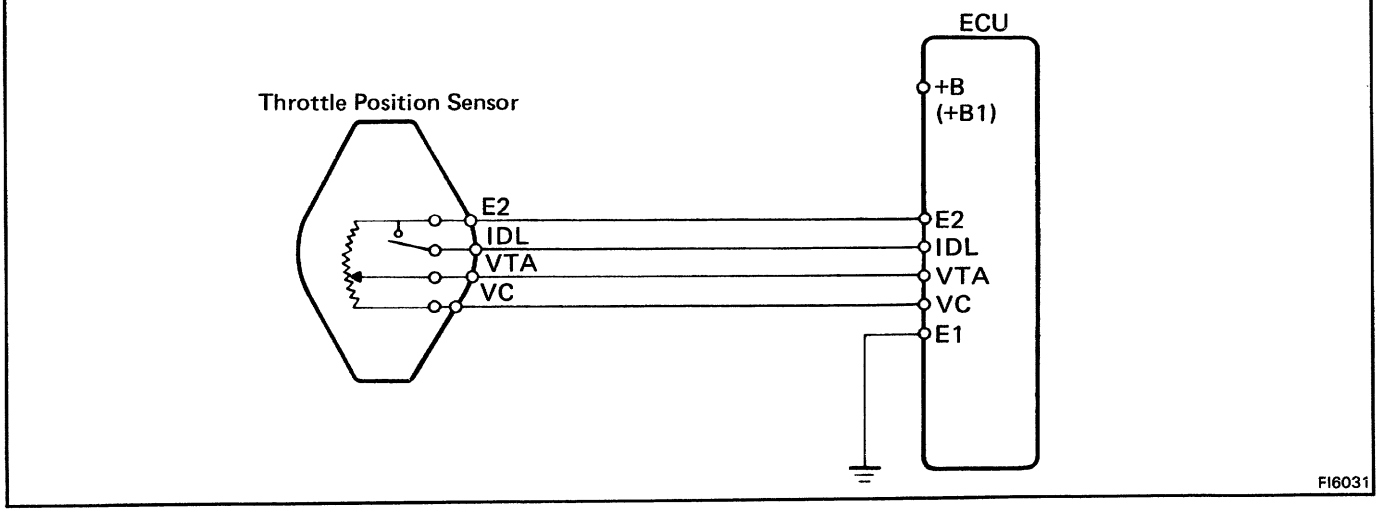
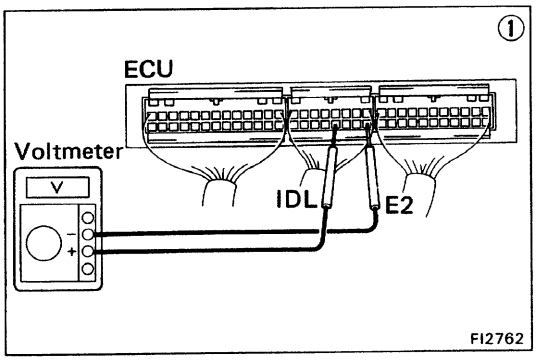
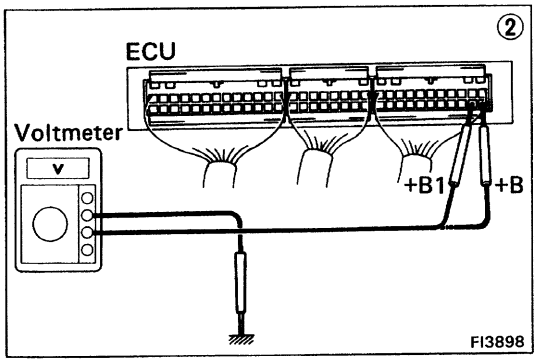
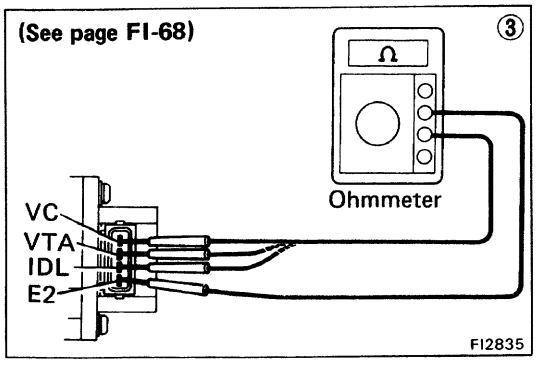
| No. | Terminals | Trouble | Condition | | STD Voltage |
|---|---|---|---|---|---|
| 2 | IDL – E2 | No voltage | Ignition SW ON | Throttle valve open | 4 – 6 V |
| | VC – E2 | | | – | 4 – 6 V |
| | VTA – E2 | | | Throttle valve fully closed | 0.1 – 1.0 V |
| | | | | Throttle valve fully open | 3.2 – 4.2 V |




- **IDL – E2**

① There is no voltage between ECU terminals IDL and E2. **(IG SW ON)** (Throttle valve open)

② Check that there is voltage between ECU terminal +B (+B1) and body ground. **(IG SW ON)**

NO / OK

Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Refer to No.1. (See page FI–34)

BAD → Repair or replace.

OK

③ Check throttle position sensor.

BAD → Repair or replace throttle position sensor.

OK → Check wiring between ECU and throttle position sensor.

BAD → Repair or replace.

OK → Try another ECU.

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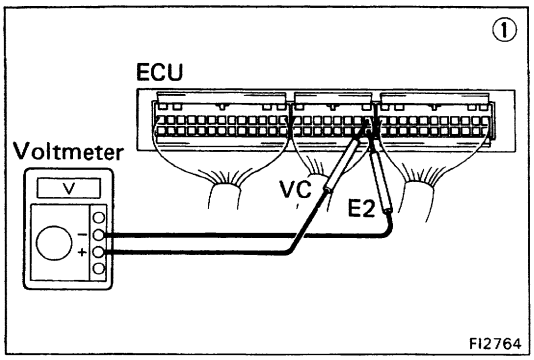


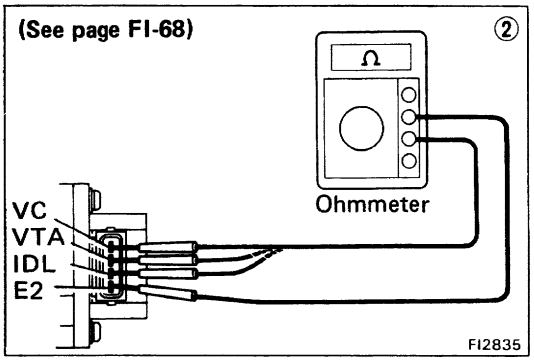


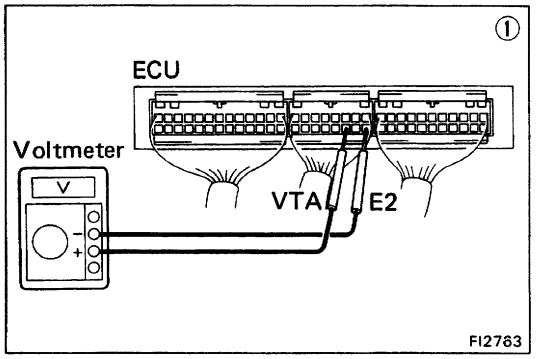


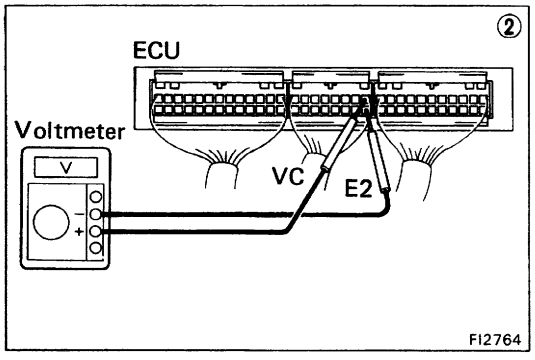


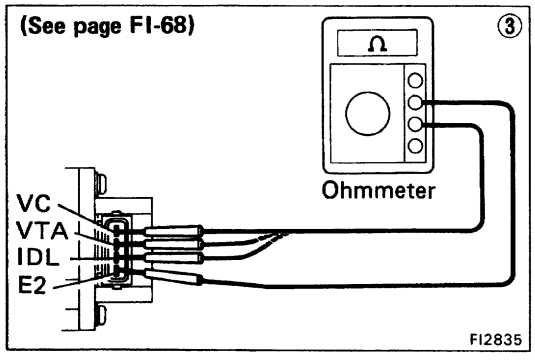


## • VC –E2

① There is no voltage between ECU terminals VC and E2. **(IG SW ON)**

Check that there is voltage between ECU terminal + B (+ B1) and body ground. **(IG SW ON)**

OK → ② Check throttle position sensor. (See page FI–68)

NO → Refer to No. 1. (See page FI–34)

BAD → Repair or replace.

OK → Check wiring between ECU and throttle position sensor.

OK → Try another ECU.

BAD → Repair or replace wiring.

## • VTA–E2

① There is no voltage at ECU terminals VTA and E2. **(IG SW ON)**

② Check that there is voltage between ECU terminals VC and E2. **(IG SW ON)**

NO → Refer to VC – E2 trouble section.

OK → (3) Check throttle position sensor.

BAD → Repair or replace.

OK → Check wiring between ECU and throttle position sensor.

BAD → Repair or replace.

OK → Try another ECU.

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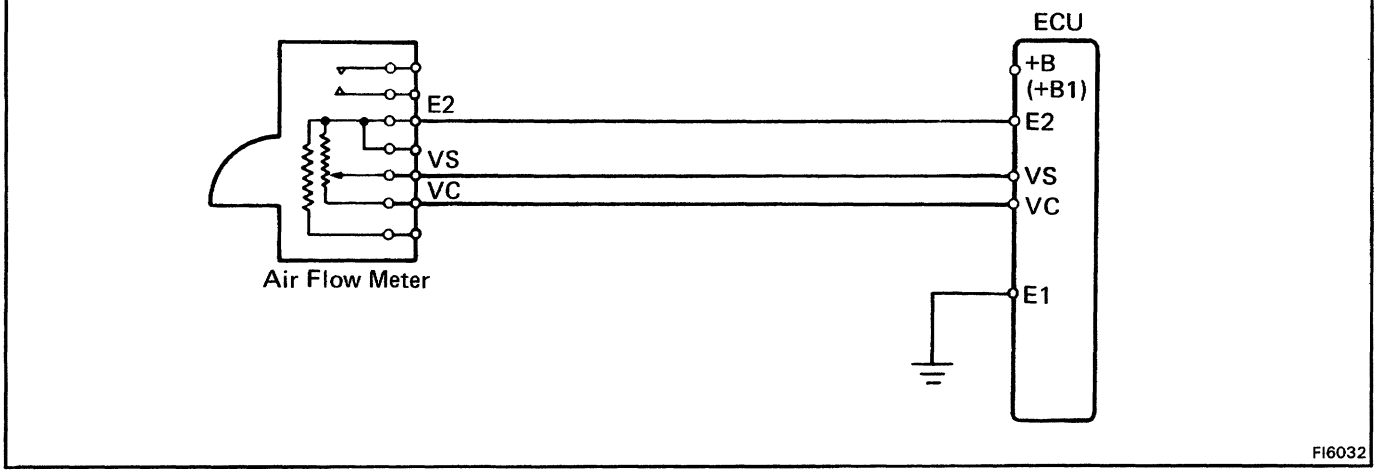
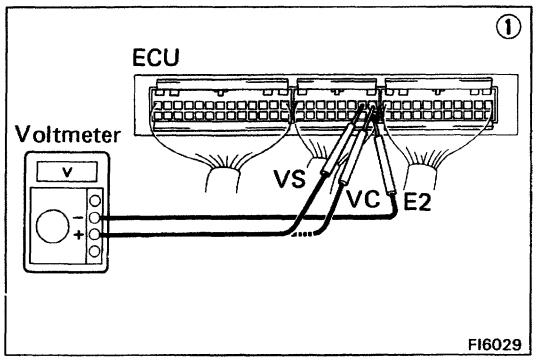
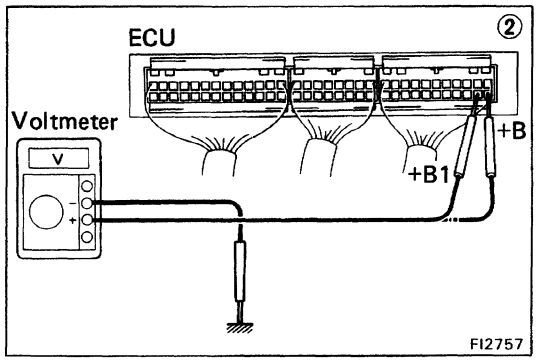
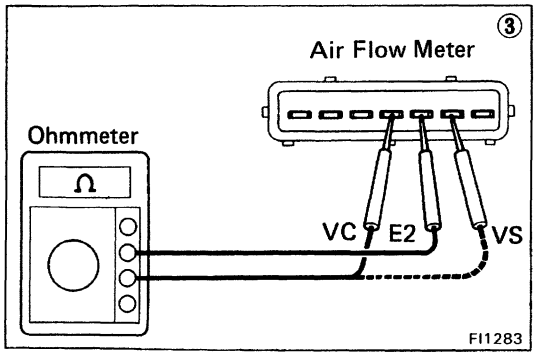
| No. | Terminals | Trouble | Condition | | STD Voltage |
|---|---|---|---|---|---|
| 3 | VC – E2 | No voltage | Ignition SW ON | – | 4 – 6 V |
| | VS – E2 | | | Measuring plate fully closed | 3.7 – 4.3 V |
| | | | | Measuring plate fully open | 0.2 – 0.5 V |
| | | | Idling | – | 2.3 – 2.8 V |
| | | | 3,000 rpm | – | 1.0 – 2.0 V |




① There is no voltage between ECU terminals VC or VS and E2. **(IG SW ON)**

↓

② Check that there is voltage between ECU terminal +B (+B1) and body ground. **(IG SW ON)**

OK ↓ / NO → Refer to No. 1. (See page FI–34)

↓

Check wiring between ECU terminal E1 and body ground.

OK ↓ / BAD → Repair or replace.

↓

③ Check air flow meter. (See page FI–66)

BAD ↓ Replace air flow meter.

OK ↓ Check wiring between ECU and air flow meter.

OK ↓ Try another ECU.

BAD → Repair or replace.

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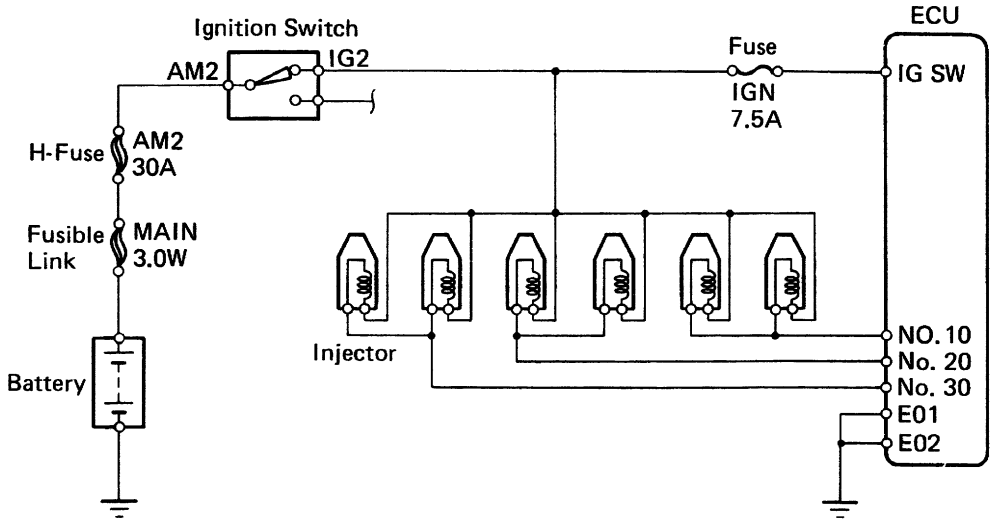
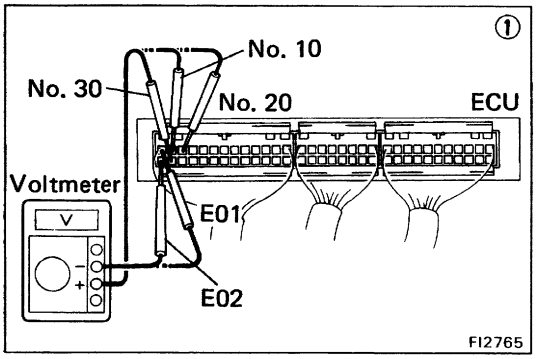
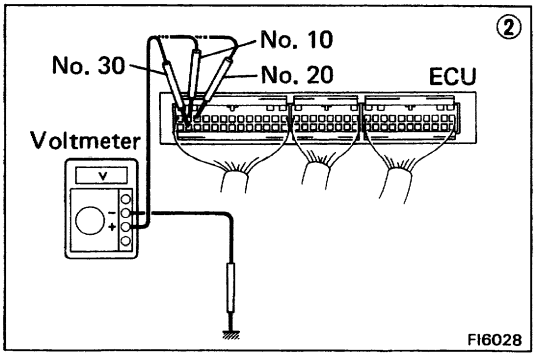
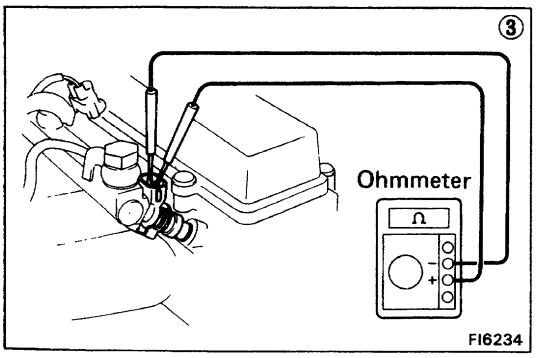
| No. | Terminals | Trouble | Condition | STD Voltage |
|---|---|---|---|---|
| 4 | No.10, No.20, No.30 – E01, E02 | No voltage | Ignition SW ON | 10 – 14 V |




① There is no voltage between ECU terminals No. 10, No. 20 and/or No.30 and E01 and/or E02. **(IG SW ON)**

↓

② Check that there is voltage between ECU terminal No. 10, No.20 and/or No.30 and body ground.

NO ← ② → OK

OK → Check wiring between ECU terminal E01 and/or E02 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check fusible links and ignition switch. — BAD → Repair or replace.

↓ OK

③ Check resistance of magnetic coil in each injector.
**STD resistance: Approx. 13.8 Ω**

OK → Check wiring between ECU terminal No. 10, No. 20 and/or No. 30 and battery. — BAD → Repair or replace.

BAD → Replace injector.

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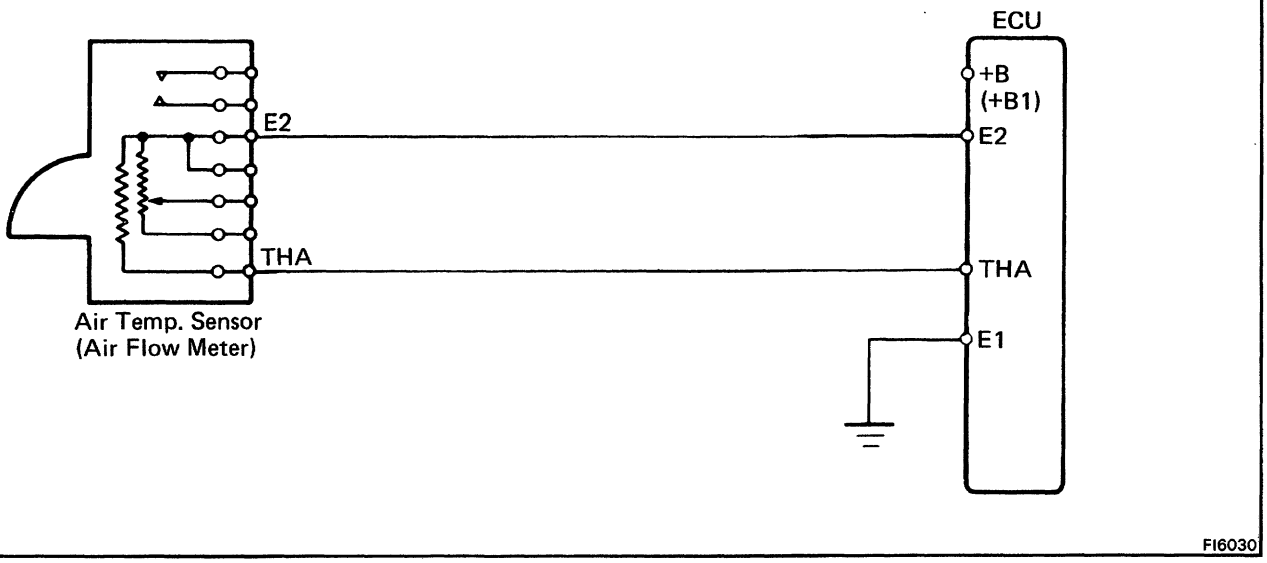
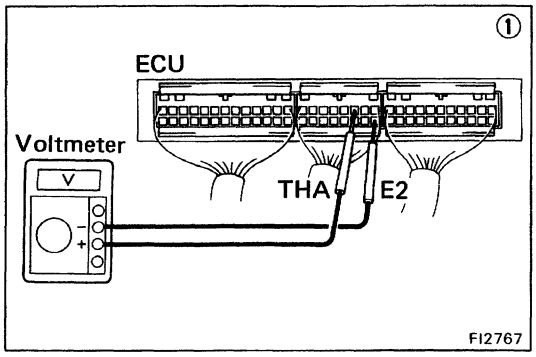
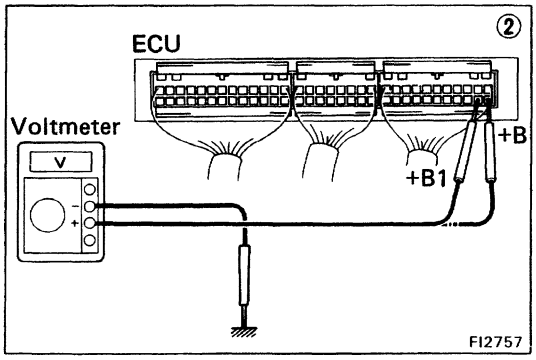
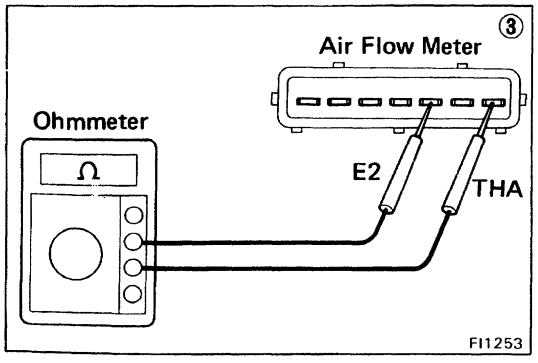
| No. | Terminals | Trouble | Condition | | STD Voltage |
|---|---|---|---|---|---|
| 5 | THA – E2 | No voltage | Ignition SW ON | Intake air temperature 20°C (68°F) | 1 – 3 V |




① There is no voltage between ECU terminals THA and E2. **(IG SW ON)**

↓

② Check that there is voltage between ECU terminal +B (+B1) and body ground. **(IG SW ON)**

↓ OK

→ NO: Refer to No. 1. (See page FI–34)

↓

Check wiring between ECU terminal E1 and body ground.

↓ OK

→ BAD: Repair or replace.

↓

③ Check air temp. sensor. (See page FI–66)

↓ BAD

→ Replace air flow meter.

↓ OK

Check wiring between ECU and air temp. meter.

↓ OK

→ Try another ECU.

↓ BAD

→ Repair or replace.

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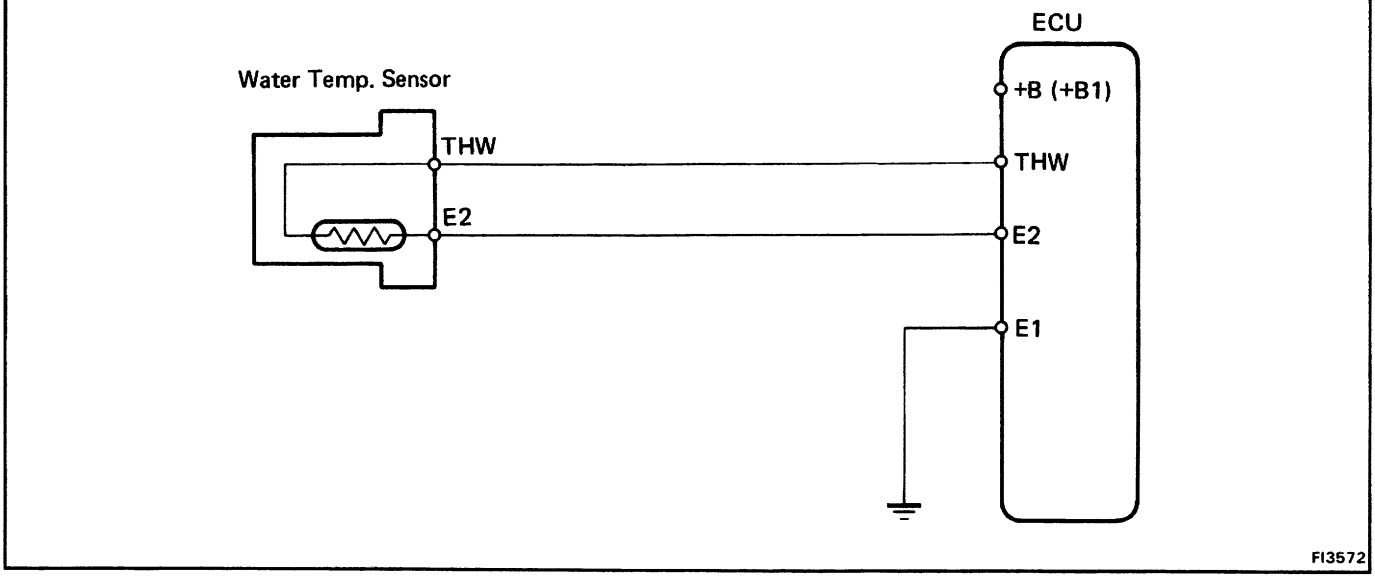
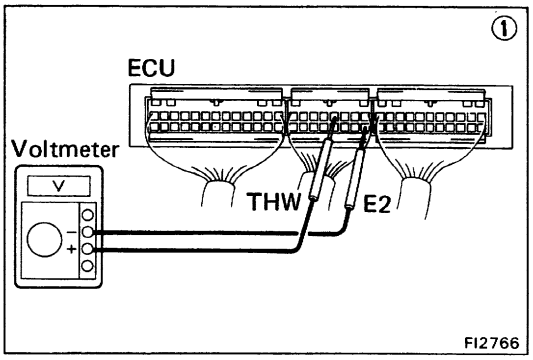
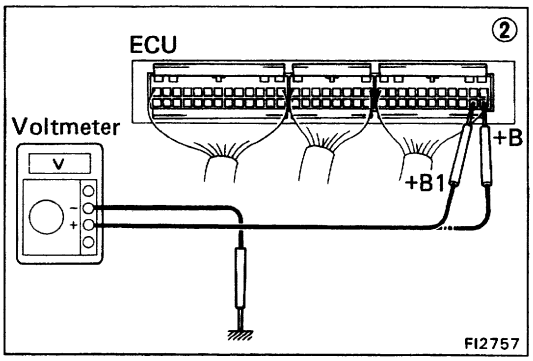
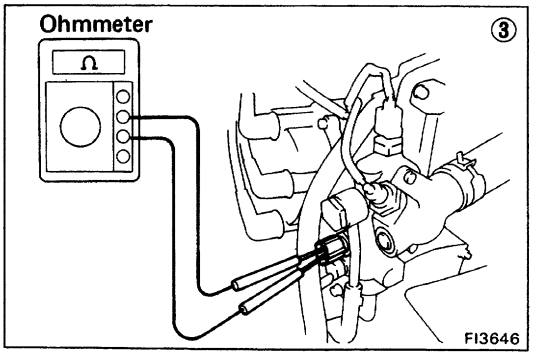
| No. | Terminals | Trouble | Condition | | STD Voltage |
|---|---|---|---|---|---|
| 6 | THW — E2 | No voltage | Ignition SW ON | Coolant temperature 80°C (176°F) | 0.1 — 1.0 V |




① There is no voltage between ECU terminals THW and E2. **(IG SW ON)**

② Check that there is voltage between ECU terminal +B (+B1) and body ground. **(IG SW ON)**

OK → Check wiring between ECU terminal E1 and body ground.

NO → Refer to No. 1. (See page FI–34)

OK → ③ Check water temp. sensor. (See page FI–78)

BAD → Repair or replace.

BAD → Replace water temp. sensor.

OK → Check wiring between ECU and water temp. sensor.

OK → Try another ECU.

BAD → Repair or replace.

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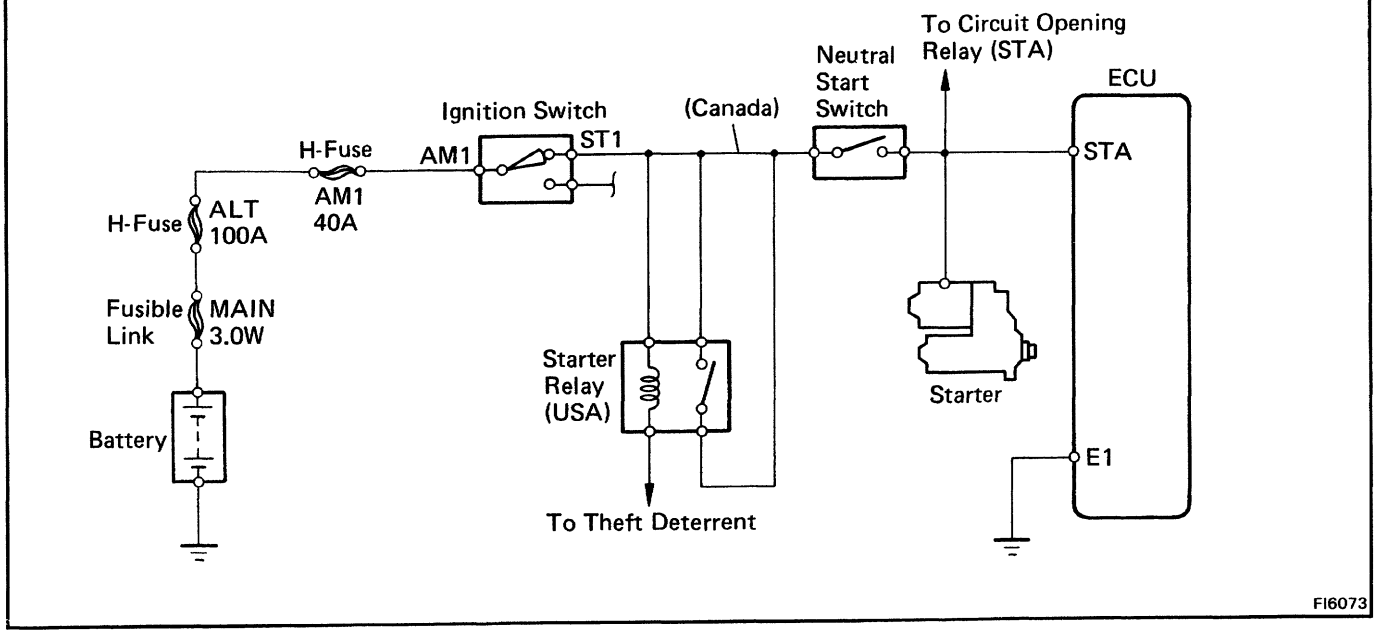
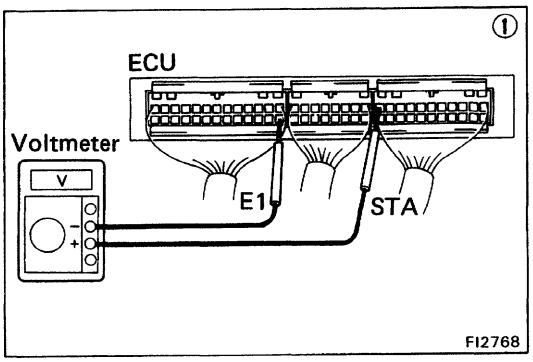
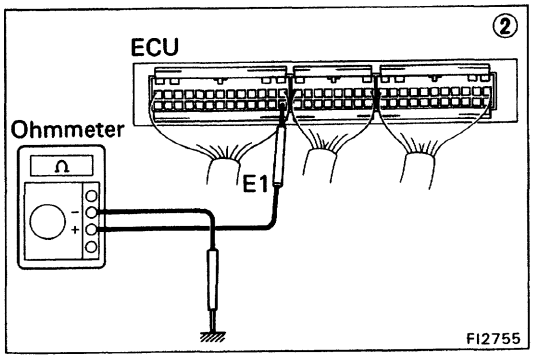
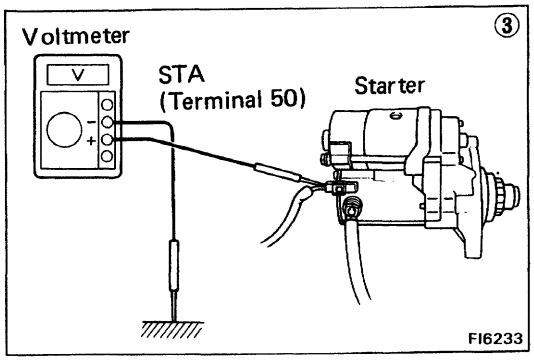
| No. | Terminals | Trouble | Condition | STD Voltage |
|---|---|---|---|---|
| 7 | STA – E1 | No voltage | Cranking | 6 – 14 V |




① There is no voltage between ECU terminals STA and E1. **(IG SW START)**

Check starter operation.
- OK → Check wiring between ECU terminal STA and ignition switch terminal ST1.
  - OK → ② Check wiring between ECU terminal E1 and body ground.
    - OK → Try another ECU.
    - BAD → Repair or replace.
  - BAD → Repair or replace.
- BAD → Check fusible link, battery, wiring, ignition switch and neutral start switch.
  - BAD → Repair or replace.
  - OK → ③ Check that there is voltage at STA (50) terminal of starter. **(IG SW START) STD voltage: 6 – 14 V**
    - OK → Check starter.
    - NO → Check wiring between ignition switch terminal ST1 and starter terminal 50.

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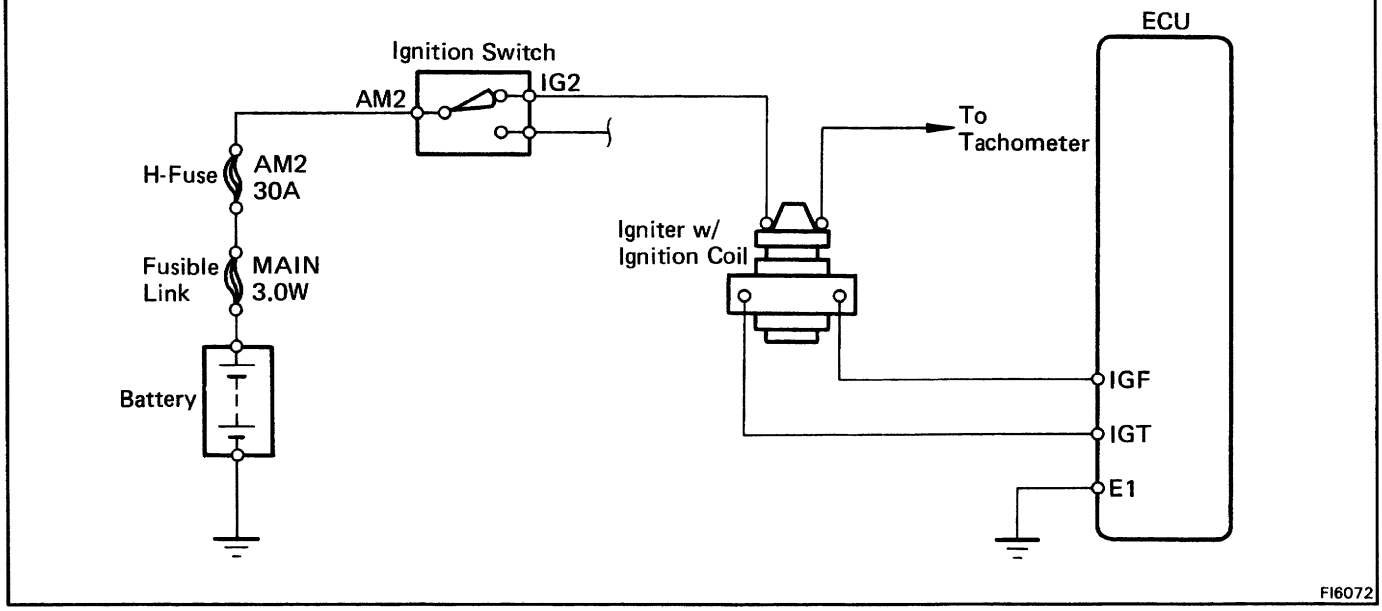
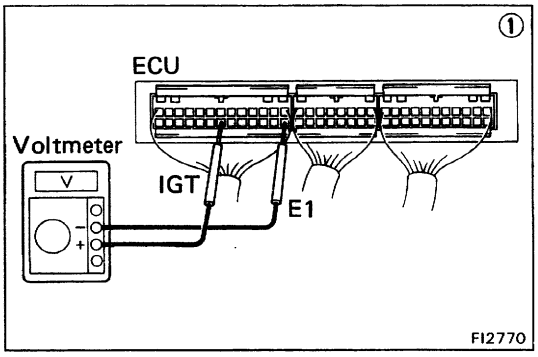
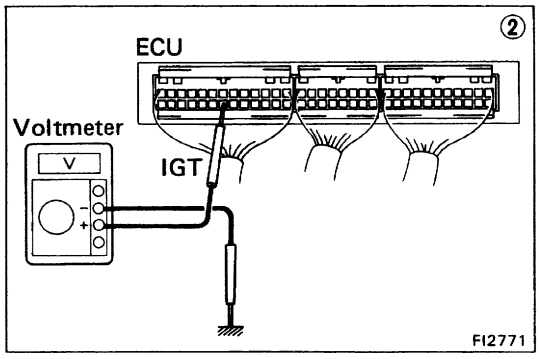
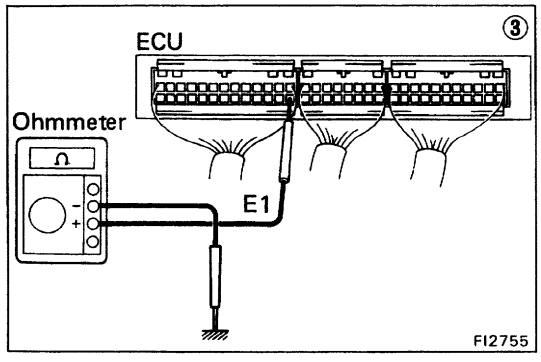
| No. | Terminals | Trouble | Condition | STD Voltage |
|---|---|---|---|---|
| 8 | IGT — E1 | No voltage | Idling | 0.7 — 1.0 V |




① There is no voltage between ECU terminals IGT and E1. **(Idling)**

② Check that there is voltage between ECU terminal IGT and body ground. **(Idling)**

NO → ③ Check wiring between ECU terminal E1 and body ground. → BAD → Repair or replace.

③ OK → Try another ECU.

② OK → Check fusible link and ignition switch. → BAD → Repair or replace.

Check fusible link and ignition switch. OK → Check distributor. (See page IG–8) → BAD → Repair or replace.

Check distributor. OK → Check wiring between ECU and battery. → BAD → Repair or replace.

Check wiring between ECU and battery. OK → Check igniter. → BAD → Repair or replace.

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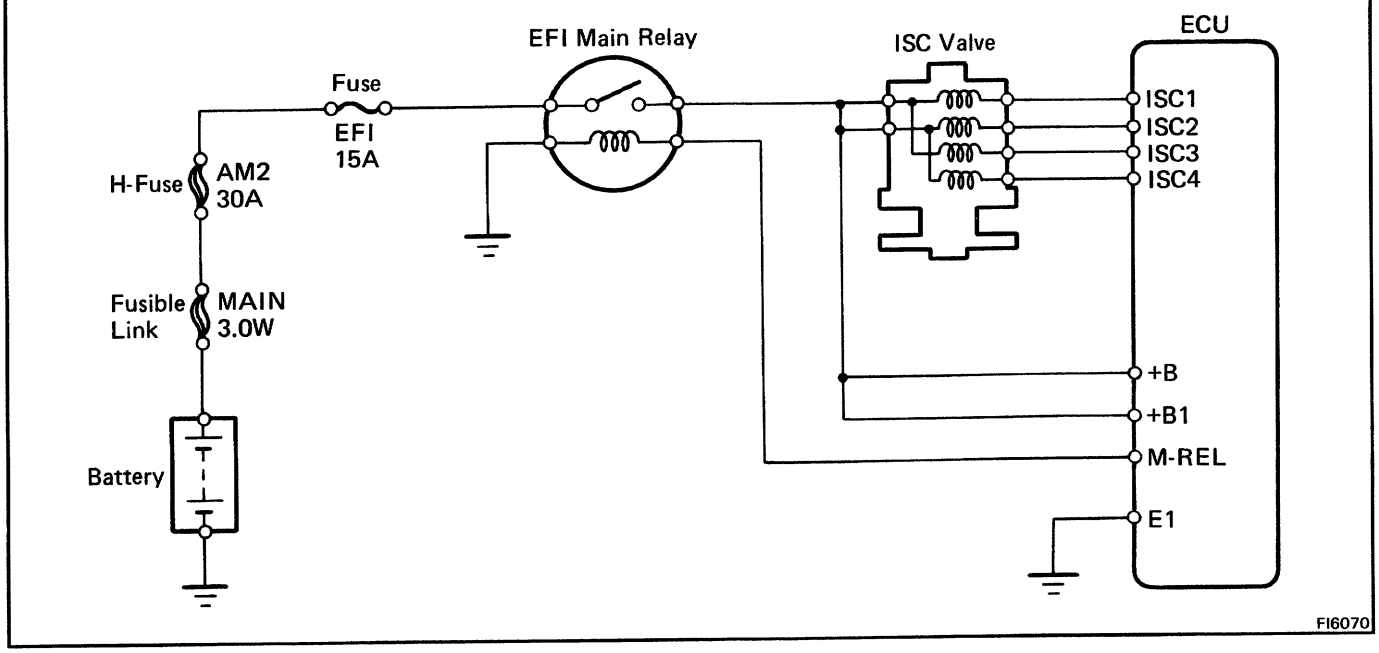
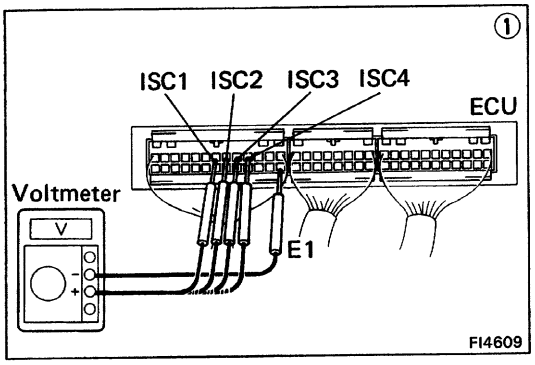
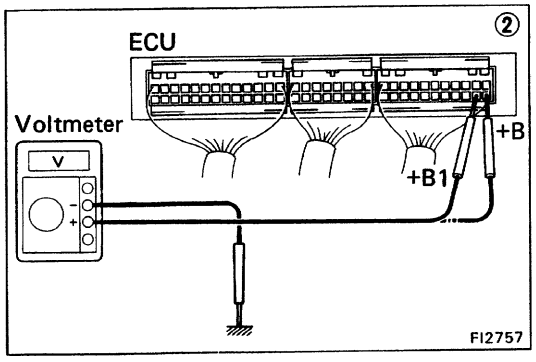
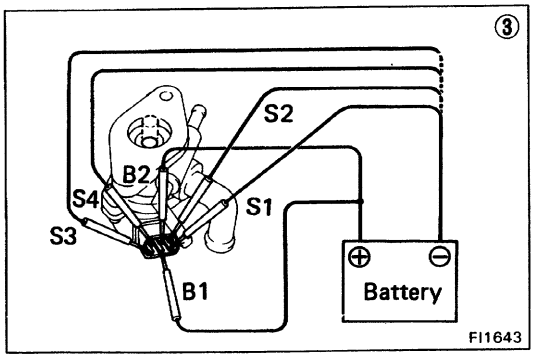
| No. | Terminals | Trouble | Condition | STD Voltage |
|---|---|---|---|---|
| 9 | ISC1 ~ ISC4 — E1 | No voltage | Ignition SW ON | 9 — 14 V |




① There is no voltage between ECU terminals ISC1 – ISC4 and E1. **(IG SW ON)**

② Check that there is voltage between ECU terminal +B (+B1) and body ground. **(IG SW ON)**

OK

NO

Refer to No. 1. (See page FI–34)

Check wiring between ECU terminal E1 and body ground.

OK

BAD

③ Check ISV valve. (See page FI–73)

Repair or replace.

BAD

OK

Replace ISC valve.

Check wiring between ECU and EFI main relay.

OK

BAD

Try another ECU.

Repair or replace.

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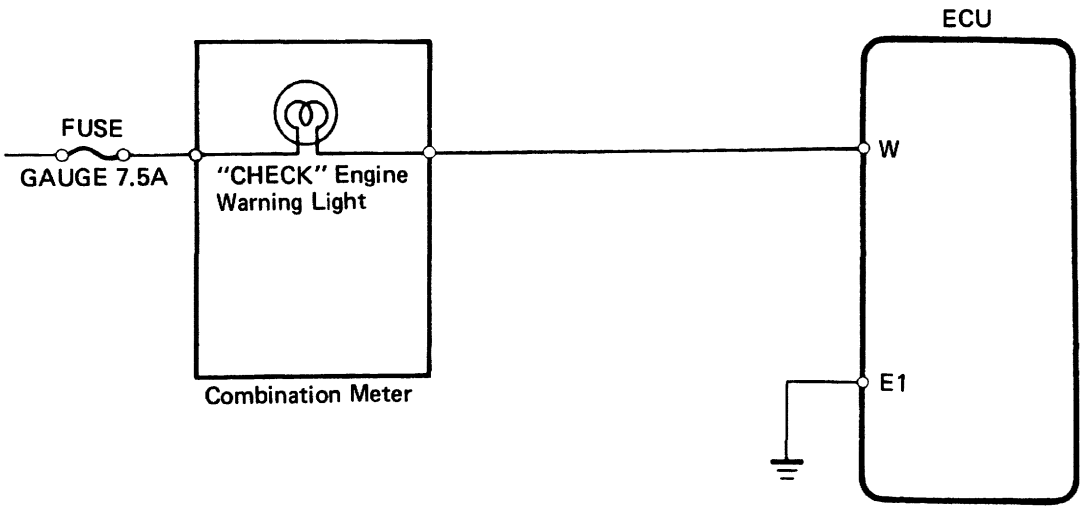
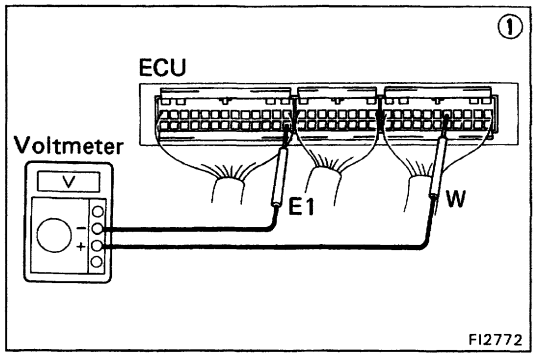
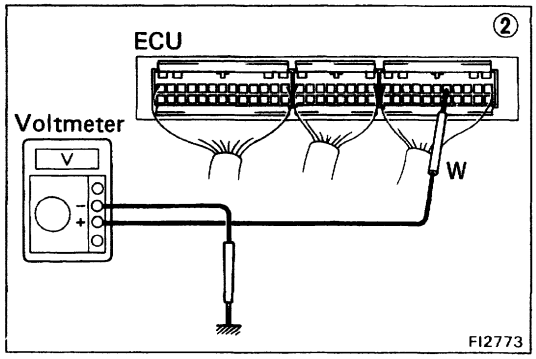
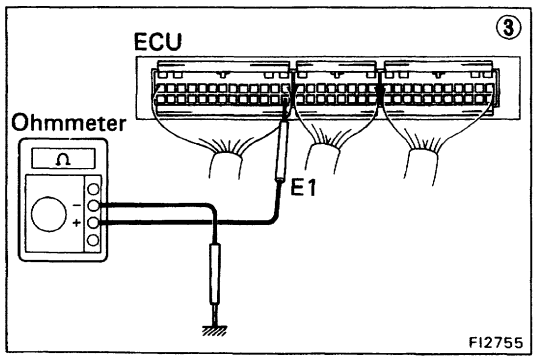
| No. | Terminals | Trouble | Condition | STD Voltage |
|---|---|---|---|---|
| 10 | W – E1 | No voltage | No trouble (""CHECK" engine warning light off) and engine running | 8 – 14 V |




① There is no voltage between ECU terminals W and E1. **(Idling)**

↓

② Check that there is voltage between ECU terminal W and body ground.

NO → ↓ OK

③ Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or Replace.

↓

Check GAUGE fuse (7.5 A) and "CHECK" engine warning light.

OK → ↓ BAD → Repair or replace.

Fuse blows again

↓

Check wiring between ECU terminal W and fuse.

BAD → Repair or replace.

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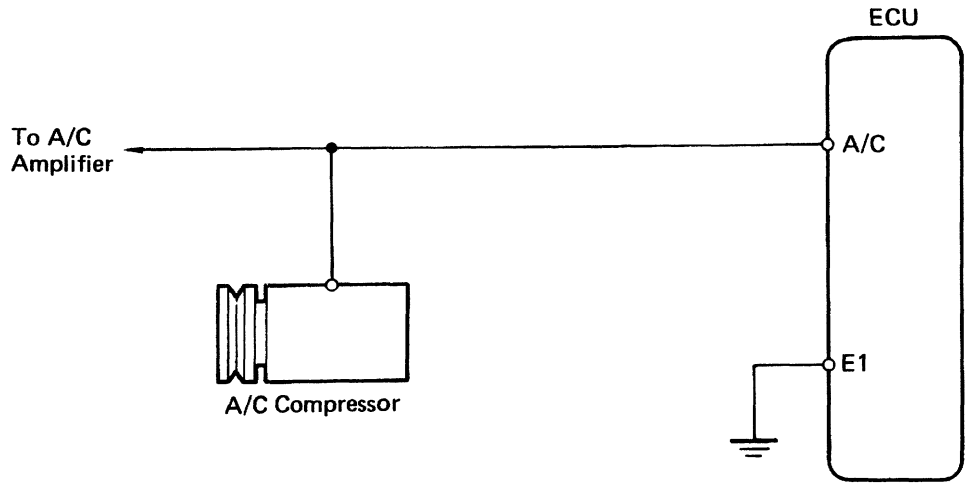
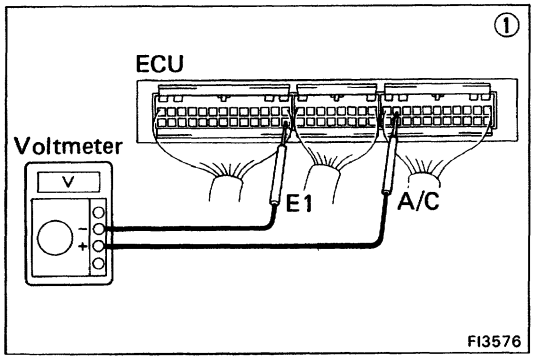
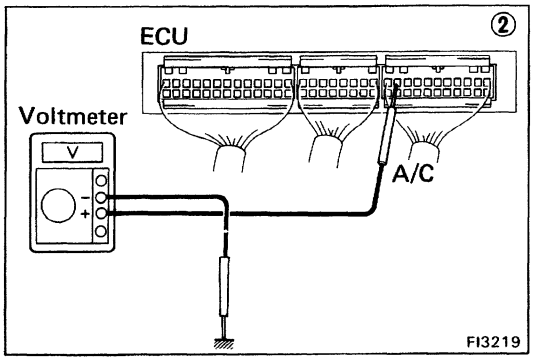
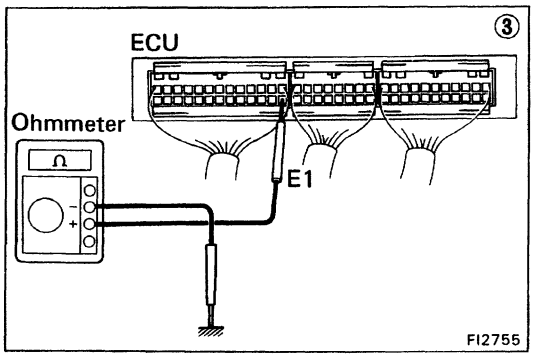
| No. | Terminals | Trouble | Condition | | STD Voltage |
|---|---|---|---|---|---|
| 11 | A/C – E1 | No voltage | Ignition SW ON | Air conditioning ON | 10 – 14 V |




① There is no voltage between ECU terminals A/C and E1. **(Air conditioning ON)**

② Check that there is voltage between ECU terminal A/C and body ground.

NO → ③ Check wiring between ECU terminal E1 and body ground.
- OK → Try another ECU.
- BAD → Repair or replace.

OK → Check compressor running.
- OK → Check wiring between ECU terminal A/C and amplifier.
  - BAD → Repair or replace.
- BAD → Check that there is voltage between amplifier terminal and body ground.
  - BAD → Repair or replace.
  - OK → Check wiring between amplifier and ECU or compressor.
    - BAD → Repair or replace.

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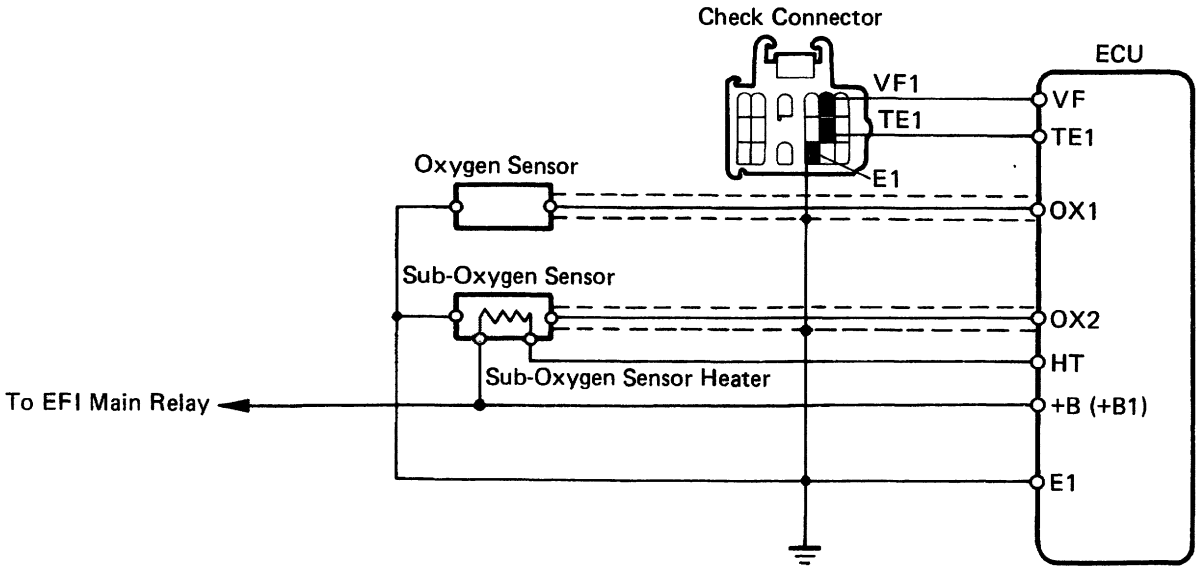
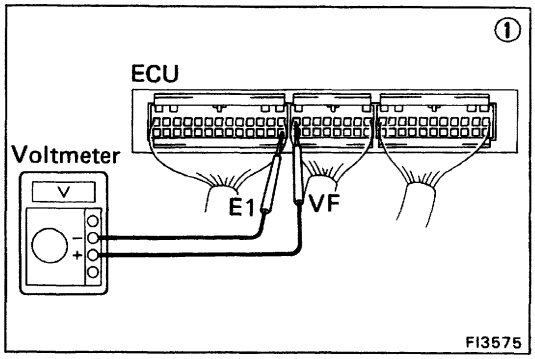
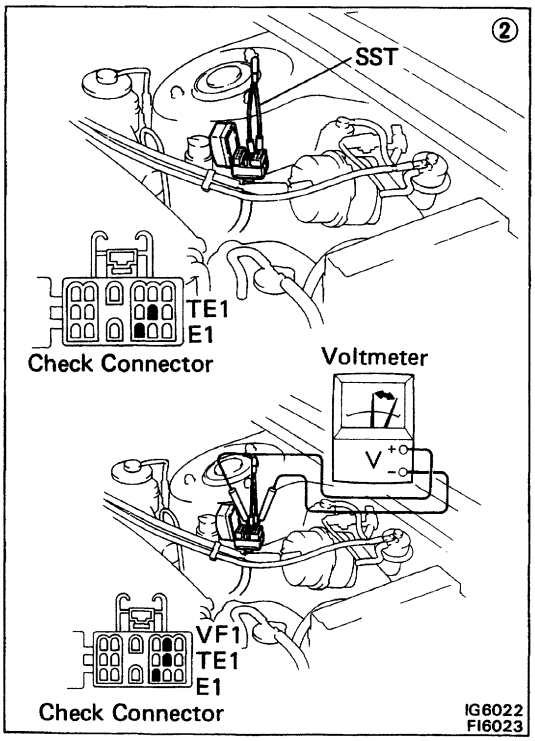
**California Specification Vehicles only**




(1) There is no voltage between ECU terminals VF and E1.

Check that there is specified voltage between ECU terminal VF and body ground.

NO → OK

Check wiring between ECU terminal E1 and body ground.

OK → Try another ECU.

BAD → Repair or replace.

Check for suction of air into exhaust system — BAD → Repair air suction.

OK

Check for air leak from air intake system. — BAD → Repair air leak.

OK

Check spark plugs. — BAD → Repair or replace.

OK

Check distributor and ignition system. — BAD → Repair or replace.

OK

Check fuel pressure. — BAD → Repair or replace.

OK

Check injectors. — BAD → Repair or replace.

OK

Check cold start injector.* — BAD → Repair or replace.

OK

Check air flow meter. — BAD → Repair or replace.

OK

Check operation of oxygen sensors. — OK → System normal.

BAD

Check wiring between oxygen sensors and ECU connectors. — BAD → Repair wiring.

OK

Repair oxygen sensors.

* Rich malfunction only.

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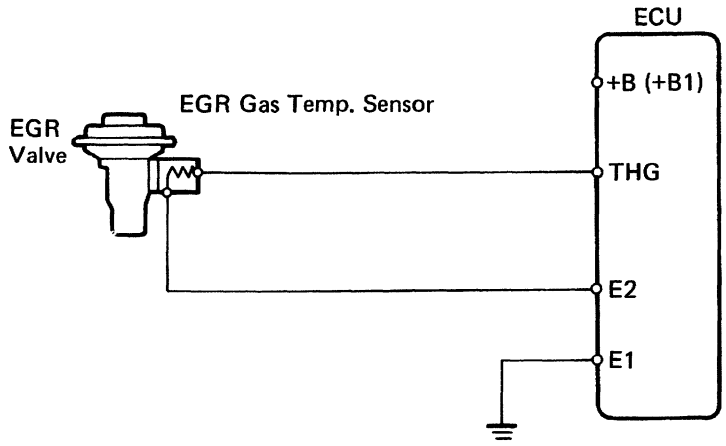
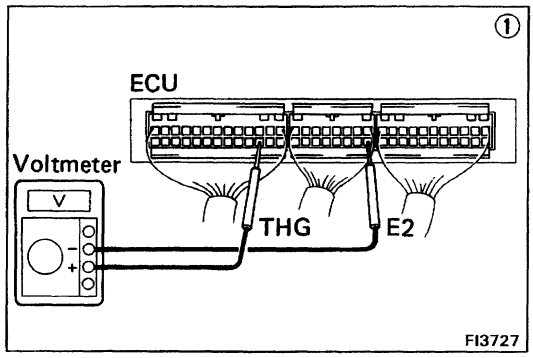
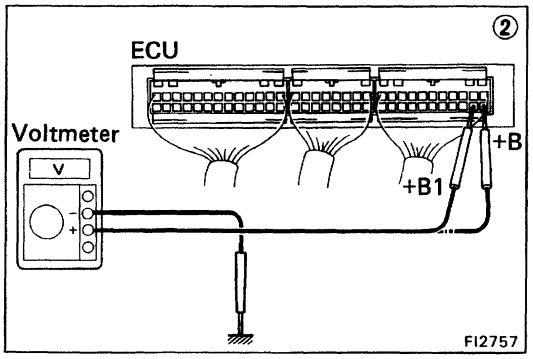


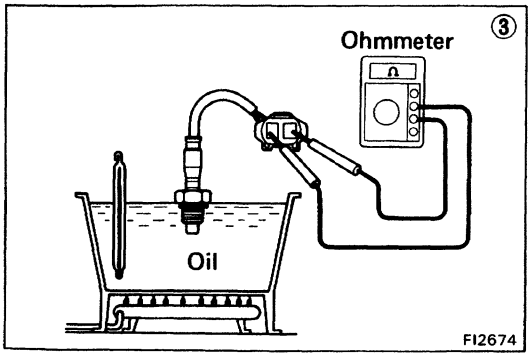

FI2680




FI3727




FI2757




FI2674

① There is no voltage between ECU terminals THG and E2. **(IG SW ON)**

② Check that there is voltage between ECU terminal + B (+ B 1) and body ground. **(IG SW ON)**

OK → Check wiring between ECU terminal E1 and body ground.

NO → Refer to No. 1. (See page FI–34)

OK → Check EGR system.

BAD → Repair or replace.

OK → ③ Check EGR gas temp. sensor. (See page FI–81 )

BAD → Replace EGR gas temp. sensor.

OK → Check wiring between ECU and EGR gas temp. sensor.

OK → Try another ECU.

BAD → Repair or replace.

BAD → Repair or replace.